COMPARISON OF CARIES EXPERIENCE WITH THE SALIVARY LEVELS OF STREPTOCOCCUS MUTANS AND LACTOBACILLI IN 8-14 YEARS OLD CHILDREN BETWEEN INSTITUTIONALIZED(ORPHANAGE) CHILDREN AND SCHOOL GOING CHILDREN IN NAMAKKAL DISTRICT, TAMILNADU.

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In Partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH- VIII

DEPARTMENT OF PEDODONTICS AND PREVENTIVE DENTISTRY

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TITLE OF DISSERTATION	"Comparison of caries experience with the salivary levels of streptococcus mutans and lactobacilli in 8-14 years old children between institutionalize (orphanage)children and school going children Namakkal District,Tamilnadu".
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Dr. S.S.GAYTRY

Post Graduate Student

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ABBREVIATION

S.NO	ABBREVIATION	EXPANSION
1.	MS	Mutans Streptococci
2.	S.Sorbinus	Streptococci Sorbinus
3.	ECC	Early Childhood Caries
4.	MSB	Mitis Salivarius Bacitracin Agar
5.	BCY	Buffered Charcoal yeast extract agar
6.	TYCSB	Trypticase,yeast,cystine,bacitracin agar
7.	OHI-S	Oral Hygiene index-Simplified
8.	DMFT	Permanent teeth Decay ,Missed,Filled teeth scores
9.	dmft	Primary teeth decay ,missed,filled teeth scores
10.	BMI	Body mass index
11.	PUFA Index	Pulpal involvement,ulcerations,Fistula and Abscess.
12.	S-ECC	Severe -Early Childhood Caries.
13.	pH	Potential of Hydrogen.
14.	LB	Lactobacilli
15.	DS	Down syndrome
16.	PI	Plaque Index
17.	GBI	Gingival bleeding Index

18.	ID	Intellectual disability
19.	deft	decayed,extracted,filled teeth
20.	defs	decayed,extracted,filled sufaces of teeth
21.	QoL	Quality of life
22.	CPI	Community periodontal index
23.	C.albicans	Candida Albicans
24.	MSKB	Mitis salivarius kanamycin bacitracin agar
25.	CFU	Colony Forming Units
26.	ADA	American Dental Association
27.	SMCC	Streptococci Mutans colony count
28.	LBCC	Lactobacilli colony count

INTRODUCTION

Dental caries has microbial organisms which causes the calcified tissues of the teeth to demineralise and destruct the organic and the inorganic molecules. It is one of the important problems in the field of dentistry affecting the mankind. It also inserts a social, mental, physical and financial burden on the individuals in the developing countries.

Although enjoying good oral health includes more than just having healthy teeth, many children have inadequate oral and general health because of active and uncontrolled caries. Oral health and general wellbeing related to each other. If the oral health of children develops unfavorably, they should be considered a risk group demanding special attention for planning of Dental Health Program.[1]

It is now been well accepted that dental caries is an infectious and transmissible disease, which is strongly modified by diet.

The various etiological factors involved in dental caries may thus be summarized as:

i) Cariogenic microorganisms

ii) Fermentable carbohydrates

iii) Susceptible tooth and host

iv) Time.[2]

Although every child has a similar microflora, each has unique characteristics that influence his/her caries development. The parameters used for microflora also show

distinctive variations, for example differences have been observed between real and suspected cariogenic bacteria at both species and subspecies level. [3]

According to Walter J. Loesche 1986 the prevailing opinion in clinical dentistry has been that the accumulation of bacterial communities on the tooth surfaces known as dental plaque, causes both decay and periodontal disease.[4]

Dental caries is closely associated with mutans streptococci (MS) colonizing the oral cavity. Streptococcus mutans and S. sobrinus in particular are known to be crucial in the initial phase of dental caries. It has been shown that many children acquire MS in early childhood, mostly transmitted from their mothers.

The most critical time in these terms takes place between 19 and 31 months, although younger children may also become colonized.**[6]**

According to P.W.Caufield, et al (2015), lactobacilli have been associated with dental caries for over a century. Lactobacilli appear to be planktonic, opportunistic settlers that can gather and multiply only in certain restrictive niches of the bost, at least within the oral cavity. The following essential requirements are necessary for sustained colonization of lactobacilli in humans:

1) a stagnant, retentive niche that is mostly anaerobic;

2) a low pH milieu; and

3) Ready access to carbohydrates. [5]

According to the clinical guidelines of the American Academy of Pediatric Dentistry, Early childhood caries (ECC) is ‘the presence of 1 or more decayed, missing or

filled surfaces' in any primary tooth in a child at 71 months of age or younger. In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries. From ages of 3 through 5 years, one or more cavitated, missing or filled smooth surfaces in primary maxillary anterior teeth, or a decayed, missing or filled surface with a score of 4 (age 3 years), 5 (age 4 years) or 6 (age 5 years) constitutes severe early childhood caries.[7]

The main reason for the poor oral hygiene and decay of teeth being in wide spread of population is due to lack of awareness of necessity of maintaining a proper oral hygiene and carious process. Also the cost effectiveness of treatment is also a reason for not taking proper treatment.

The side-by-side rise in caries prevalence in developing countries is mainly because the oral health care systems in these countries mostly focus on curative care, whereas community-based prevention and oral health promotion have not been systematically implemented. [8]

India, a developing country, faces poor oral health because there are many challenges in rendering oral health needs to children.

Despite several attempts to cure and prevent the disease, its prevalence has increased over the last couple of decades. These changing trends in the prevalence of dental caries need continuous understanding and investigation. [8]

Orphans are socially isolated and deprived group without parents or caretakers who are in need of medical and dental support. It has been clear that caries is still a most prevalent and a major public oral health problem among orphans.

Numerous studies conducted in different parts of India brings out the caries prevalence and oral health status of different populations. There are also studies which reveal the oral health status and knowledge of orphanage children towards oral health. These data's given by different studies will help the social caretakers, government organization and dental professionals of that locality to render their helping hands to them.

There have been many studies conducted in orphanage and normal school going children on their oral health status, caries prevalence's and salivary levels of Streptococcus Mutans and Lactobacilli individually. So far comparison of caries experience with the salivary Levels of Streptococcus Mutans and Lactobacilli between institutionalized (orphanage) Children and school going children is not done. Henceforth this study is carried out with the following aims and objectives.

AIM OF THE STUDY

- To comparatively evaluate the caries experience of institutionalized children with that of school children of age 8-14 years in Namakkal District.

OBJECTIVES OF THE STUDY

- To determine the caries prevalence among the institutionalized children to that of the school going children and to correlate the findings
- To evaluate the salivary levels of streptococcus mutans and lactobacillus among the groups
- To compare the salivary levels of streptococcus mutans and lactobacillus with that of DMFT/dmft scores within the groups.

Clarke.J.K. et al (1924) conducted a study to decide whether Bacilli acidophilus is primary cause for carious lesion or they are secondary cause for caries. Finally he noticed a peculiar dull, grayish white colonies attracted attention which proved to be streptococcus of very distinctive but not acidophile but an acid producer. It was described as Streptococcus Mutans. [(9)]

Rogosa.M et al (1951) developed a selective agar for lactobacilli by investigating 2000 human and animal oral samples under control of concentrations of certain nutrients as phosphate, citrate, acetate, salts, sorbitan monooleate, and hydrogen ions. This led to the new medium SL agar. [(10)]

Steinle JC et al in 1967 performed a study by taking impression of oral cavity and an agar replica was made with Rogosa agar and was incubated for 72 hours at 37˚c which were then microscopically evaluated lactobacilli growth sites. A comparison between the lactobacilli level from salivary samples collected from the same individuals with agar lactobacilli growth sites was evaluated. The agar-replica method detected lactobacillus sites in all but one of the subjects, with a salivary lactobacillus count of more than 5,000 lactobacilli/ml. of saliva. [(11)]

Stoppelaar J.D. et al (1971) treated the strain of Streptococcus mutans with a mutagenic agent. This resulted in isolation of a mutant which, compared to the original strain, had lost the ability to form sticky deposits on hard surfaces in sucrose medium. Apart from colonial morphology, the mutant had not changed in any other characteristic studied. In a 9- week experiment with hamsters the average caries score induced by the mutant was significantly lower than that induced by the parent strain. In a 5-week experiment using germfree rats, the mutant had virtually lost its carcinogenicity in sharp

contrast to the original *Strep. Mutans. In* all instances the implanted microorganisms could be recovered from the animals during all phases of the experiments. [(12)]

Gold .G.O. et al (1973) developed a selective medium for Streptococcus Mutans containing sucrose of 20 % concentration and bacitracin concentration 0.2 units/ml which demonstrated an effective recovery of low level of Streptococcus Mutans from salivary, dental plaque samples and also of samples collected from dorsum of tongue. This led to the development of MSB agar (Mitis Salivarius Bacitracin agar). [(13)]

The consistency of colonization of tooth surfaces by Streptococcus mutans was studied by **R. J. GIBBONS et al (1974)**, sampling four approximal molar surfaces of 9- to 13-year-old children at weekly intervals. Of the total surfaces studied, 81.7% were either consistently positive or consistently negative throughout five consecutive weekly samplings. The number of tooth surfaces colonized by detectable proportions of S. mutans was found to be far lower in a group of 18 children from Charlotte, N.C., with a low past caries experience than in 20 children from Danvers, Mass., with a high caries experience. The number of tooth surfaces infected with S. mutans therefore strongly paralleled the caries experience of these populations.[(14)]

W. J. Loesche et al (1975), investigated the association of Streptococcus mutans with human dental decay by using several types of samples: (i) paraffin-stimulated saliva samples taken from children with from 0 to 15 decayed teeth; (ii) pooled occlusal and approximal plaque taken from children with no decayed or filled teeth, or from children with rampant caries of 10 or more teeth; (iii) plaque removed from single occlusal fissures that were either carious or noncarious. Seventy-one percent of' the carious fissures had Streptococcus mutans accounting for more than 10% of the viable flora,

whereas 70% of' the fissures that were caries free had no detectable Streptococcus mutans. Sixty-five percent of' the pooled plaque samples from the children with rampant caries had S. mutans accounting for more than 10% of' the viable flora, whereas 40%. Of the pooled samples from children that were caries free had no detectable S. mutans. Saliva samples tended to have low levels of' Streptococcus mutans and were equivocal in demonstrating a relationship between S. mutans and caries. [(15)]

Shigeyuki Hamada et al (1976), carried out an epidemiological investigation to identify and determine the serotypes of Streptococcus mutans from carious lesions of young Japanese children. The epidemiological survey suggested that serotype c strains were most prevalent in dental plaques of Japanese children. The d and e serotypes were rare and serotypes a and b were not detected. It was also noted that more than one serotype of S. mutans could be found in the same locus of a carious lesion and that there might be no relationship between the degree of caries and the causative serotype(s) of S. mutans. [(16)]

C.G.Emilson and D.Bratthall (1976) collected plaque samples and evaluated the growth of streptococcus mutans in different agars mitis-salivarius (MS) agar, MC agar, mitis-sucrose-bacitracin (MSB), BCY agar, and MM10 .He concluded that S. mutans from plaque samples plated on MC and MSB agar yielded about 75% of the counts obtained on MS or the nonselective medium. When the proportions of S. mutans were expressed as a percentage of the total cultivable flora, the selective media (MC and MSB agar) showed approximately 10% lower values than the MS, BCY, and MM10 sucrose agar. [(17)]

P.W.Caufield (1993) reported first that initial acquisition of MS occurred in 38 children at the median age of 26 months during a discrete period which was designated as the "window of infectivity".[(6)]

Guglielmo C et al (2000) conducted a study on caries experience and streptococcus and lactobacilli salivary levels in 6-8 years old Sardians. In this study they investigated about 84 children of 6 years and 88 children of 8 years. They assessed the DMFT/dmft, OHI-S scores with Mutans streptococci and Lactobacilli salivary levels. They concluded that, statistically significant differences were found for streptococcus mutans and lactobacilli between those with and without caries experience in primary teeth ($p<0.05$) in both age groups. In permanent teeth the score of lactobacilli was significantly related to the presence or absence of caries in older group [(3)].

A study was conducted by **C.S.Toi (2000) et al on** the levels of Mutans Streptococci and Lactobacilli in healthy and carious teeth in the same mouth of children with and without dental caries .Results showed no relationship between mutans streptococci, lactobacilli counts and dmft in children with caries. Yet, statistically significant correlation was found in counts of mutans streptococci (P=0.0001) between caries-free teeth and carious lesions in the same mouth. Mutans streptococci and lactobacilli numbers were significantly higher in caries-free teeth in children with caries than in healthy children (P=0.05; P=0.01) [(18)]

Krishna Kumar R et al (2002) conducted a study on comparison of levels of Mutans Streptococci and Lactobacilli in children with nursing bottle caries, rampant caries, healthy children with 3-5 dmft/DMFT and healthy caries free children .It was concluded that there was no statistical difference observed between Mutans Streptococci

and Lactobacilli count collected at the carious lesion. Whereas Mutans Streptococci levels were significantly higher than Lactobacilli at the early carious lesion and sound tooth structure. [(2)]

Cristiane et al (2004) conducted a study on two-hundred and forty individuals, divided into five groups as follows: caries-free children, children with caries, children with rampant caries, young adults with and without caries. Whole stimulated saliva was collected and all individuals were investigated for DMFT/dmft according to the WHO criteria and the simplified oral hygiene index (OHI-S).The highest total counts of microorganisms were found in the group of children with caries. No statistically significant differences were observed for salivary flow, OHI-S and microorganism counts between the groups of young adults. No correlation between mutans streptococci counts and anti-Streptococcus mutans IgA levels was observed in the studied groups. A correlation between increased anti-Streptococcus mutans IgA levels and caries-free status was observed among young adults but not among children.[(19)]

Sudha P et al (2005) conducted a study on the prevalence of dental caries among 5-13 year old children of Mangalore city. About 524 children were inspected .The sample consisted of 193,160 and 171 children in the 5-7, 8-10 and 11-13 years. They concluded that the prevalence of dental caries was highest in 5-7 years compared to 8-10 years and 11-13 years age groups[(8)].

PP.Hedge et al (2005) conducted a cross-sectional study in 372 school going children of Belgaum aged 13-15 years. The study was to estimate the salivary levels of Streptococcus mutans and Lactobacilli and to study the relationship between these microorganisms and dental caries experience. The mean DMFT recorded was 2.41.

Streptococcus mutans was detected in 87.37% and Lactobacilli in only 36.71% of the sample. Statistically, highly significant relation was found between Streptococcus mutans and DMFT categories (2 =125.36, P< 0.001), while Lactobacilli was not statistically related to DMFT categories ($\chi 2$ =8.78, P>0.05).[20]

Jana Olak et al (2006) conducted a study on dental health and oral mutans streptococci in 2–4-year-old Estonian children. They diagnosed caries in 42% of the children, and the average (±SD) dmft index was 1.6±2.5.The proportion of caries-free children decreased from 82% in the younger to 63% in the older group. Among the tested subjects, 58% were colonized with Mutans Streptococcus, and those with caries were colonized more often than children with no visible caries (80% and 51%, respectively; P= 0.001) [21].

A study was conducted by **Al-Mudallal (2008) et al**, in which fifty plaque samples was collected from teeth. Forty five samples were considered to be positive bacterial isolates about (10^4 bacteria /ml) using selective Ms-agar (Mitis-Salivarius agar) medium. Thirty isolates were considered to be related to the genus streptococcus and specially to the mutans streptococci of various group; S. sobrinus (serotype D, G), S. mutans (serotype C, F) S. cricetus (serotype A) and S. rattus (serotype B) with percentages of (39.29%), (30.30%), (18.18%) and (3.03%), respectively depending on biochemical and Lancefield grouping identification systems. **[22]**

According to **Aas et al(2008)** molecular methods was used to detect all bacterial species associated with caries in primary and permanent teeth and to determine the bacterial profiles associated with different disease states. Plaque was collected form 39 healthy controls and from intact enamel and white-spot lesions, dentin lesions, and deep-

dentin lesions in each of 51 subjects with severe caries. In subjects with S. Mutans, additional species, e.g., species of the genera Atopobium, Propionibacterium and Lactobacilus, were present at significantly higher levels than those of S.mutans, Lactobacillus spp Bifidobacterium dentium, and low-pH non-S. mutans streptococci were predominant in white-spot lesions, while known acid producers were found at their highest levels later in disease. Bacterial profiles change with disease states and differ between primary and secondary detitions. Bacterial species other than S. mutans, e.g., species of the genera veillonella, Lactobacillus, Bifidobacterium, and Propionibacterium, low-pH non-S. mutans streptococci, Actinomyces spp., and Atopobium spp., likely play important roles in caries progression. [(23)]

Dental examination was performed by **Camacho A.G. (2009) et al** in eighty-six girls 6 to 11 years of age the sum of decayed, missing and filled teeth in the primary (deft) and permanent (DMFT) teeth and found that a total of 90.7% of the girls and had caries in both dentitions. The deft was 5.65 ± 3.35 and the DMFT was 0.51 ± 0.82. A preventive program especially focused on these 3 factors should be implemented, creating awareness that caries is an important public health problem in our country. Programs for dental cleaning and prompt attention of caries should be included. [(24)]

The study conducted by **Sakeenabi and Hiremath (2011)** assessed the possible relationship among salivary cariogenic microflora, buffer capacity, secretion rate, and caries experience among 6-year-old school-going children in Davangere city, India. The mean dmft and dmfs score for the overall group was 3.20 and 5.43, respectively. Out of 196 children, 96 were boys and 100 were girls. High levels of salivary microbiological

counts in correlation with the caries data stress the importance of these factors and urge the necessity of elective preventive programs in this region.[25]

V.H.Sushant(2011) et al, assessed the effectiveness of peer group health promotion model among 11 to 16 year old orphans at Puduchery, South India. A clinical trial of 6 months duration was carried out among 72 orphans with age ranging from 11 to 16 years residing in Cluny Padmini Sneha Illam, at Puduchery, India. The findings of this study indicated a statistically significant lower mean plaque score of 0.54 ± 0.20 at 6th month when compared to the baseline score of 1.76 ± 0.24 which indicates that oral hygiene of orphans was improved using a peer group approach model of oral health promotion.[26]

Vikram khare et al (2012) conducted a study on prevalence of dental caries and treatment needs among the Orphan Children and Adolescents of 883 with age 7-18 years of Udaipur District, Rajasthan, India. The study concluded that prevalence of dental caries in primary teeth was found to be 49.6% and in permanent teeth was 41% [27].

Dhanya Muralidharan (2012) et al conducted a study on the oral health status of orphanage children at an institute in Nellore district of Andhra Pradesh, India. Mean treatment requirements per child decreased at 18 months. New caries lesions developed among four children. BMI of children with decay was seen to improve significantly after instituting the comprehensive dental health care program. [28]

Al-Jobair AM (2013) et al conducted a study to evaluate the medical and dental health status of orphan children from 4 to 12-years-old, and compare them with children living with their parents. Approximately 36% of the orphans had medical conditions compared to 14.4% of the control children. The control children visited the dentist more

than the orphans (p<0.001). Approximately 96% of the orphans had dental caries compared to 90% of the control children (p<0.001). Decayed-missing and-filled teeth/surface index scores were higher among orphans (p=0.004) compared to the control children (p<0.001). Orphans scored higher in PI (p=0.009), GI (p=0.002), and OHI (p<0.001).[29]

PI Ojahanon (2013) et al conducted a study to determine the oral hygiene status of institution dwelling orphans. Seventy-three percent of the orphans were found to have fair oral hygiene comprising mostly of those aged 6-13 years. More females were in this category while more males presented with poor oral hygiene status .[30]

A cross sectional survey was conducted among 488 children of 12-14 years living in 5 different orphanages of Mysore district, India by **Shanbhog R(2013) et al**. The PUFA ratio indicates 21% of decayed component had progressed to pulp involvement and abscess formation. The overall prevalence of PUFA was 37.7%. 31.1% children showed one or more pulpally involved tooth in their oral cavity. Correlation between periods for being the child in the institute to DMFT showed negative value indicting decrease in DMFT as the duration of stay in orphanage increases.[31]

A study conducted by **Sreeja.R (2013) et al** on identifying of Salivary Streptococci and Lactobacilli in Children with Differing caries experiences in a rural indian population. Higher total salivary Streptococci and Lactobacilli counts exist in cleft subjects with caries than in the non-cleft subjects. Positive correlation between dmft/DMFT scores and salivary Streptococci reinforces its role in dental caries. S. mutans and S. sobrinus are the biotypes more frequently associated with dental caries in children.[32]

Priyadarshini et al (2014) conducted a study on the relationship between severe-early childhood caries, salivary mutans streptococci, and lactobacilli in preschool children of low socioeconomic status in Bengaluru city. Twenty-one out of 25 children with severe early childhood caries were positive for Mutans streptococcus and 22 children were positive for Lacto bacilli. A significant difference in the mean number of Mutans streptococcus colonies (12.2 vs. 4.16) and Lacto bacilli colonies (8.4 vs. 3.8) among children with Severe early childhood caries and caries-free counterparts (P <0.01) was also found. A significant positive correlation was also found between caries experience and salivary Mutans streptococcus and Lacto Bacilli counts [(33)].

Karunakaran et al (2014) conducted a study that covered a total of 850 school going children in the Namakkal district of Tamil Nadu. The age group selected for this study ranged from 4 to 6 years of age. Of 850 children examined, 560 (65.88%) children had dental caries. Mean dmft score was 2.86. It was concluded that dental caries was higher in boys (69.6%) than in girls (61.5%). The untreated decay teeth accounted for 92.4%. [(34)]

Rinki Hans et al (2014) conducted a study on the Oral Health Knowledge, Attitude and Practices of Children and Adolescents of Orphanages in Jodhpur City Rajasthan, India. A sample of about a total of 100 children aged 4 to 19 y resided in two orphanages and concluded that the mean dental caries status of the study subjects was found out to be 1.40 (SD= 1.78) [(35)].

Ankita Gaur et al (2014) conducted a cross-sectional study among 166 children residing in juvenile and orphanage home with 384 school children and concluded that the prevalence of dental caries was higher among the school going children (62.12%) with

juvenile group having (52.4%) but the oral hygiene was poor among the juvenile group children with respect to those of school going group [36].

Sadeq Ali (2014) conducted a case-controlled study involving 202 institutionalized male-orphan children and 202-age and sex matched non-orphan schoolchildren as controls and found a high prevalence of oral mucosal lesions, poor oral hygiene practices, but lower prevalence of dental caries among orphans when compared with non-orphan school children. There is an apparent need for dental health programs to target the institutionalized orphans in particular and school children in general in order to improve their oral health status and prevent oral diseases.**(37)**

Kalyana Chakravarthy (2014) et al conducted a cross-sectional study to evaluate the unmet restorative treatment need among orphanage children of Uttara Kannada district. DFMT, PUFA and specific caries index were used to evaluate the dental caries. A total of 256 children were surveyed for unmet dental treatment need out of which 138 were girls. 80% of the children were caries free in permanent dentition while only 48% were caries free with respect to deciduous dentition using DMFT/dmft indices. Pulpal involvement was seen among 31% of the children using PUFA index. Absolute treatment need with DT and dt indices were 91 and 545 in number while with specific caries index it was seen to be 705. **(38)**

Arpita Mohan(2014) et al conducted a study to compare the oral and dental health status of children living in orphanages and children living with their families which was conducted in Lucknow city among children of age group 5-14 years living in orphanages and school children living with their parents of Lucknow city. A total of 80 orphan children and 80 school children of age group 5-14 years were taken for the study.

About 21.8 percent school children were without any clinical finding whereas only 2.5 percent orphan children had no clinical finding. The hard tissue lesions were found in 83.7 percent while these were in 57.2 percent school children. The soft tissue lesions were found in 70.0 percent orphan children while these were in 31.2 percent school children.[39]

Abhishek Sharma(2014) et al assessed the oral health status and treatment needs of 5, 12 and 15 year-old orphanage children. Prevalence of caries was highest in 12 year old females. Mean DMFT was 1.64± 1.52 and 1.52 ± 1.03 among 12 year old males and females, while mean DMFT of 15 year old males and females was 0.94± 0.89 and 2.07± 2.14 respectively with statistically significant difference. The clinical examination highlighted untreated caries and no filled component which may be attributed to poverty, illiteracy, poor awareness and lack of oral health services.[1]

A study conducted by **Thakur A.S (2014) et al** assessed the levels of Mutans Streptococci and lactobacilli in children and mothers of children with early childhood caries (ECC), severe early childhood caries (S-ECC) and a caries free group in a low income population. designed amongst 75 preschool children of 3-5 year old and their mothers .Stimulated saliva samples were collected from each mother and child pair for bacterial assessment. Microbial count was higher in the mothers and children with ECC and S-ECC than caries free group. Mothers can be targeted for intervention, for prevention of early childhood caries.[40]

Mujahid M (2014) et al, examined the relationship of caries risk, salivary pH, and levels of cariogenic Streptococcus and Lactobacillus in relation to tobacco abuse. The study indicated that the level of Streptococcus is appreciably higher among

smokeless tobacco abusers. Whereas, a non-significant relation was obtained among the groups presented with Lactobacilli. A lower salivary pH was observed in tobacco smokers as compared with chewers. There was a significant relation between Streptococcus and salivary pH in caries-free chewers and Lactobacilli and salivary pH in subjects (consume smoke and smokeless tobacco) with dental caries. These alterations in bacterial count and salivary pH due to long-term effect of tobacco usage can render oral mucosa vulnerable to various dental diseases. **(41)**

A longitudinal study was conducted by **Nelson (2014) et al** on 194 very-low birth weight (VLBW) and 184 normal birth weight (NBW) infants. He hypothesized that the causal pathway between birth group (VLBW or NBW) and mutans streptococci (MS) acquisition (presence) at 18-20 month is mediated by biological, behavioral, and caregiver MS levels. Mutans streptococci presence was similar between birth groups at 18-20 months (40% in VLBW infants and 49% in NBW infants), but was significantly higher for NBW infants at 8 months. Increased number of teeth at 8 and 18-20 months was associated with biological risk. Infants whose caregivers had a I-point higher score on MS had a significantly (1.5) higher odds of MS presence. Caregiver behavior was not associated with MS presence. Early-intervention efforts should focus on delaying initial acquisition and improving caregiver awareness of taking care of erupting primary teeth. **(42)**

Steinberg (2014) et al investigated the distribution of oral cariogenic bacteria among 12-year-old Palestinian children attending schools in East Jerusalem . Salivary levels of mutans streptococci (MS) and Lactobacilli (LB) were examined. Overall, 52.1% of the examined children presented the highest possible ranking score categories for MS

bacteria, with only 5.4% in the lowest category. Only 12.6% of the school children presented the highest LB score, while 25% had the lowest ranking score. Levels of MS and LB were found to be strongly related with socioeconomic status among Palestinian children in East Jerusalem. The relatively high prevalence of cariogenic bacteria suggests that oral care prevention and treatment demands special attention from the health care institutions and authorities. [(43)]

Sudipta Kar et al (2015) conducted a study, to evaluate dental caries status of 4-12 years old children. The case group consisted of orphan children in the studied area in 2012 -2013.The control group consisted of normal 4-12 years old children who were also resident of the studied area. A sample of 284 orphan and 298 normal children was examined. Statistically significant difference found in studied (orphan) 34.15% and control group (normal children) 17.44%.[(44)]

According to **S. Mounika (2015) et al** assessed the prevalence of microbial species such as Streptococcus mutants and Streptococcus sanguis in patients with dental caries . And to determine the colonies formed by Streptococcus mutants and Streptococcus sanguis in patients with dental caries . The saliva samples were found to have significant S.sangius count and less significant S.mutans count .[(45)]

Daniela Esian (2015) et al performed a study in 60 children of age between 6-11 years to establish the correlations between the salivary levels of Streptococcus mutans and Lactobacillus and the degree of caries activity in children. The results emphasized a statistically significant association between the degree of caries activity in children and the salivary levels of Streptococcus mutans, with specific variations depending on age, gender

and living environment of the children examined. No statistically significant association was observed between the salivary levels of Lactobacillus and the degree of caries-activity.[46]

The study performed by **Mouricio. S.J.M. (2015) et al** with 60 DS (Down Syndrome) children and 71 non-DS children aged six to 12 years old. Caries experience, plaque index (P1), and gingival bleeding index (GBI) were recorded. Down syndrome children had a similar caries experience, lower plaque index, and lower gingival bleeding index values compared to children without Down syndrome. However, DS children who had caries were more likely to display high counts of matans streptococci in saliva than non-DS children with caries. [47]

This study conducted by **Alodole RJ (2015) et al** correlated Streptococci mutans, oral lactobacilli and oral enterococci counts with dmft scores in children 4-9years of age. Unstimulated saliva were collected in sterile tubes, diluted and plated on three selective media including Mitis Salivarius Bacitracin agant (MSB), Rogosa SL agar and m Enterococcus agar. Sampling methods were compared by frequency of recovery of streptococci mutans, oral lactobacilli and oral enterococci correlation of microbial counts with dmft scors. Mean dmft for thirty three children was 6.3. significant relation was observed between streptococci mutans and dmft (p=0.553) whereas no significant relation were found between oral lactobacilli and oral enterococci with dmft. The three isolated bacteria showed no significant relation with salivary pH. Higher value for dmft was obtained for random sample of lraqi children. Streptococci mutans was a strong indicator of caries status than oral lactobacilli and oral enterococci. [48]

Yuki Oda et al (2015) used a polymerase chain reaction method to detect Mutans streptococci (Streptococcus mutans and S. sobrinus) bacteria from 145 outpatients (6–30 years old) with intellectual disabilities (ID) and their presence was compared with the incidence of dental caries. Plaque samples were collected from all erupted tooth sites in subjects with a sterile toothbrush. A dental examination was performed to determine the number of decayed and filled teeth (DFT score) in permanent dentition. Among all subjects, S. mutans and S. sobrinus were possessed by 78.7 and 83.5 %, respectively, while 13.1 % were positive for S. mutans alone, 17.9 % for S. sobrinus alone, and 65.6 % for both organisms, with 3.4 % were negative for both. The mean DFT score of subjects positive for both S. mutans and S. sobrinus at after 1 year was significantly higher than that of those positive for S. mutans alone ($P < 0.01$). The increase in caries increment was also significantly greater in subjects with both bacteria detected ($P < 0.001$).[49]

Amjad Al-Obaidullah et al (2016) conducted a study to evaluate the dental health status of female orphans (12-20 years old) living in government orphanages in Qassim , and to compare them with the status of adolescents who live with their families. The mean value of the orphan's DMFT (5.27) was found to be higher than non-orphans group (2.03). [50]

Aasim F (2016) et al conducted a study in a total of 1,664 children that included 1,201 boys and 463 girls from registered orphanages in the state of Jammu and Kashmir were included in the study. Decayed, extracted, filled teeth (deft)/ decayed, extracted, filled surface (defs) and decayed, missing, and filled teeth (DMFT)/decayed, missing, and filled surface (DMFS) indices were used to assess the caries status of primary and

permanent dentition. Results showed that caries prevalence in primary dentition was higher in subjects' ≤ 6 years of age where the prevalence was 50.9%; in subjects 7 to 11 years of age, the prevalence was 25.2%. Caries prevalence in permanent dentition within the age group 7 to 11 was 69.1%, while in subjects' ≥12 years, the prevalence was 66.2%.[51]

A cross-sectional study was conducted by **Mohit Bansal(2016) et al** at 11 orphanages of Panchkula District in which all the 464 subjects aged 4-26 years were examined. The prevalence of dental caries in permanent dentition was found to be 22.7% while for the primary dentition was 5.73%. The mean DMFT was 1.01 whereas the mean dft was 0.28. 58.1% had healthy periodontium, 28% had CPI score 2 followed by 13.6% who had CPI score 1. 16.4% subjects had various grades of dental fluorosis. 56.7% of the subjects had never visited a dental surgeon.[52]

Rohan Pratap (2016) et al study focussed on oral health including caries experience in underprivileged children. However, information concerning relationship between caries experience and quality of life (QoL) of orphanage children is scarce. The study was conducted among 200 orphanage children aged 7–18 years from six randomly selected orphanages in Bengaluru city. caries experience in primary and permanent dentition was 40.5% and 38%. Dental caries experience was similar in primary and permanent dentition among orphanage children.[53]

S. Fragkou (2016) et al examined the occurrence of S. mutans, S. sobrinus and C. albicans in dental plaque and saliva from caries-free and caries-active Greek children. 46 caries free and 51 caries-active 3-to-13-year-old children were examined using selective media for the three microbes. Caries experience was statistically significantly

related to the presence of all three microbes under study, both in dental plaque and saliva.[54]

Joshi P.S. et al (2016) conducted a study among 50 school children aged between 9 to 12 years and were divided in two groups based on their DMFT, def scores as caries active and caries free respectively with 25 subjects each. Collected saliva samples were processed to analyse salivary flow rate, buffering capacity and Streptococcus mutans count on Mitis Salivarius Kanamycin Bacitracin (MSKB) selective growth medium. Statistically significant difference was observed on quantitative and qualitative comparison of salivary flow rate, buffering capacity and log Streptococcus mutans CFU counts in saliva of dental caries active and caries free group with p value at 0.00001 ($p<0.05$).[55]

Al-Otaibi et al (2016) conducted a study on 121 Children, aged between 6-12 years old in Al-Qassim Region, KSA. The control group consisted of 85 male children without DS(Down syndrome) and the test group with DS consisted of 36 children. The criteria tested were: Caries prevalence, S mutans and Lactobacillus count, pH and buffering capacity. Results: There was no statistically significant difference between the children having Down's syndrome and normal children regarding the prevalence of dental caries in both primary and permanent teeth. Regarding the Streptococcus mutans and lactobacilli count, a highly statistically significant difference was detected where the DS children with caries present in permanent teeth have both high Streptococcus mutans and lactobacilli count more than 10^5(CFU). [56]

A cross-sectional study by **Yu Kubota(2017) et al** examined the prevalence of dental caries and associated factors among children aged 12-18 years residing in

orphanages at Phnom Penh, Cambodia. The study included 187 subjects (male = 103, female = 84, mean age = 13.28 ± 1.51 years) The caries prevalence was found to 85.2%, and 30% of the children exhibited severe caries. Significant differences in factors related dental caries were observed among different age groups ($p<0.01$) .[57]

An orphanage based study was conducted by **Ling-jiao Kong(2017) et al** A total of 722 orphans were recruited from urban and suburban areas in Chongqing. The oral health status of them was assessed through oral clinical examination. In 3 - 5 aged group, the prevalence rate of dental caries, mean dmft and filled tooth ratio were 73.98%, 3.91 and 0.21%, respectively. The prevalence of dental caries and dmft in suburban areas were higher than in urban areas ($P < 0.05$). In 12 - 15 age group, the prevalence rate of dental caries, mean DMFT and filling ratio were 42.02%, 0.89, and 4.72%, respectively. The mean DMFT in suburban areas was higher than in urban areas ($P < 0.05$).[58]

The present study was conducted in four schools and orphanages in Namakkal dt. Ethical clearance for the study was obtained by local ethical committee(IEC/VDCW/12/2015). The school and orphanage children were selected from the age group of 8-14 years. Written informed consent was procured from parents /guardians of all participants prior to taking part in the study.

Informed Consent Consideration:

Each participant was presented with a letter detailing the purpose of the study, associated risks, and arrival. Students and parents/guardian (if interested) were allowed review the room and the information. They were allowed to remain in the consultation room to view the procedure and were given relevant information. In the event if patient could not read, someone read the information out loud to the participants and their guardians. They were given an opportunity to ask questions and the researcher answered all questions prior to receiving final approval of participation in the study. Participants were also allowed to discontinue during the study period, if they were not interested furthermore. Participants were not provided with any complements for the purpose of the study. The written permission was obtained from the institutional head, principal to conduct the study.

METHODOLOGY:-

Study sample:-

The study sample consists of 200 institutionalized children and 200 school going children in Namakkal District.

SAMPLE SIZE DETERMINATION:-

To calculate the sample size to compare two proportions is given by

$$n = \frac{(Z_\alpha + Z_\beta)^2 (P_1 Q_1 + P_2 Q_2)}{(P_1 - P_2)^2}$$

where' n' is the required sample size.

Where Z_α : Z Value for level of significance

Z_β : Z Value for power of the test

P_1 : is proportion in sample 1

Q_1 : $1 - P_1$

P_2 : is proportion in sample 2

Q_2 : $1 - P_2$

Here $Z_\alpha = 1.96$ for 5% level of significance

$Z_\beta = 0.842$ for 80% power

By substituting these values in the above formula, the required sample size was calculated.

For a given P_1=62.12 and P_2= 52.4 with 5% level of significance and 80% power the required sample size is **400**. That is **200** per group.

Selection of school children:-

The school going children were selected by two stage random sampling method.

Stage 1:-Namakkal district divided into north, south, east and west zones. From each zone , one school was selected using lottery method.

Stage 2:-Among the selected schools each child was allotted a number and by using random number table, 50 children were selected from each school leading to total population of 200 school children.

Selection of orphanage children:-

The children in the orphanages were selected by two stage random sampling method.

Stage 1:- Namakkal district divided into north, south, east and west zone. From each zone , two orphanages were selected using lottery method.

Stage 2:-Among the selected orphanages each child was allotted a number by using random number table, 50 children were selected from each school leading to total population of 200 school children.

Inclusion Criteria:-

The participants of age 8-14 years and those present on the day of examination.

Exclusion Criteria:-

The children who are not resident of Namakkal District.

Those who took antibiotic in the last month.

Children with orthodontic appliances.

Medically compromised and special child.

Collection of data:-

- A self-designed proforma were made to collect data.
- The Dental caries (DMFT/dmft) Scores were recorded.

Armamentarium:- (According to ADA standardization type 3 inspections)

- Mouth mirror
- No.23 explorer
- Gloves
- Mouth masks
- Disinfectants
- Sterile cotton
- Tweezers
- Gauze piece
- Chip blower
- Kidney Tray

Each child was examined on an ordinary upright chair with the help of mouth mirror and explorer in an adequate natural light.(FIG 1 AND 2)

MICROBIAL ANALYSIS

Collection of saliva:-

Paraffin wax , stimulated whole saliva was collected between 9.30-11.30 am during the school hours.(FIG 3) The subjects will was refrained from eating for one hour before collection. 2 ml of stimulated saliva was collected in a calibrated plastic cup. (FIG 4). By means of a sterile disposable syringe 1 ml aliquot of saliva was transferred from the cup to the previously labeled sterile bottle containing 4 ml of transport media

(Thioglycollate media) and transported to the laboratory, where it was processed.

Laboratory procedures:

The salivary sample was used to vortex , to uniformly mix both the saliva and the transport media using a cyclomixer. Using an inoculation loop (4 mm inner diameter) l0 uL of the vortexed 1:5 dilution sample were streaked in duplicate on Mitis salivarius bacitracin agar (MSB)(FIG 5) for Streptococcus mutans and on Rogosa SL agar for Lactobacilli .(FIG 6)The MSB agar plates was incubated anaerobically for 48 hours at 37°C in 5% CO in nitrogen. The Rogosa SL agar plates was incubated anaerobically (FIG 7) for 96 hours at 37°C. Following incubation, counts were made of colonies with morphological characteristic for Streptococcus mutans on the MSB agar(FIG 8 &9) and of colonies will exhibit the typical morphology of Lactobacilli on Rogosa SL agar (FIG 10&11).Identification for Streptococcus mutans is to be confirmed by biochemical tests like mannitol and sorbitol fermentation and catalase test. Gram staining is also performed. Catalase test and Gram staining confirms the identity of Lactobacilli. Colony counting was done with a magnifying glass and the count of Streptococcus mutans and Lactobacilli was expressed as the number of colony forming units per millilitre (cfu/ml) of saliva. Semiquantitation of the number of colonies will be done by multiplying the actual colony count with $1x10^3$ because of the part that the saliva sample was diluted one thousand times (1:5 dilution).

FIG 1:-INTRA ORAL EXAMINATION

FIG 2:-SAMPLE NUMBERING

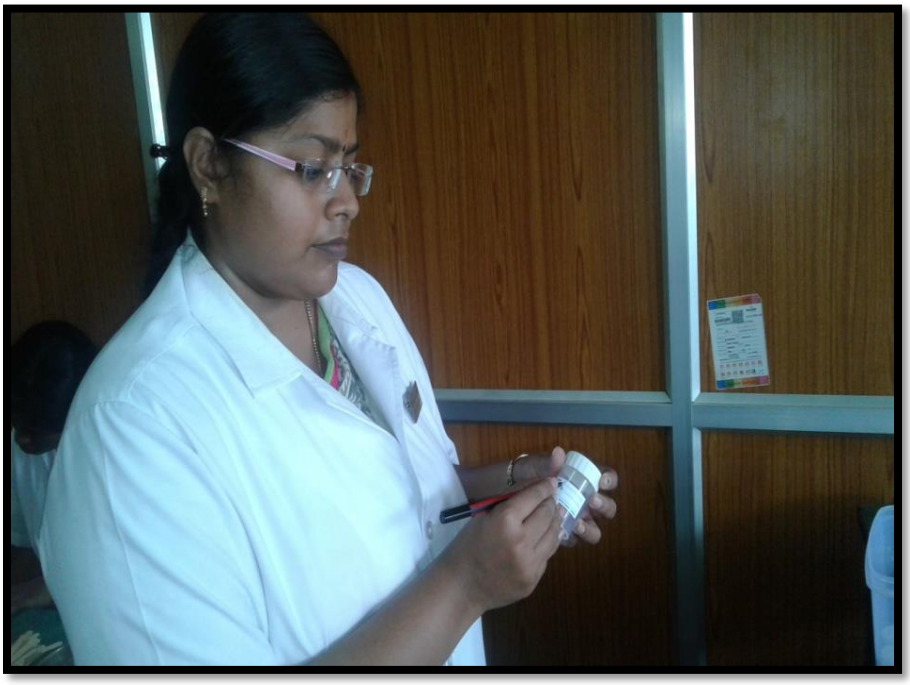


FIG 3:-PARAFFIN WAX FOR STIMULATION OF SALIVA

FIG 4:-SALIVARY SAMPLE COLLECTION

FIG 5:-COLONY FORMATION OF STREPTOCOCCUS MUTANS

FIG 6:-COLONY FORMATION OF LACTOBACILLI

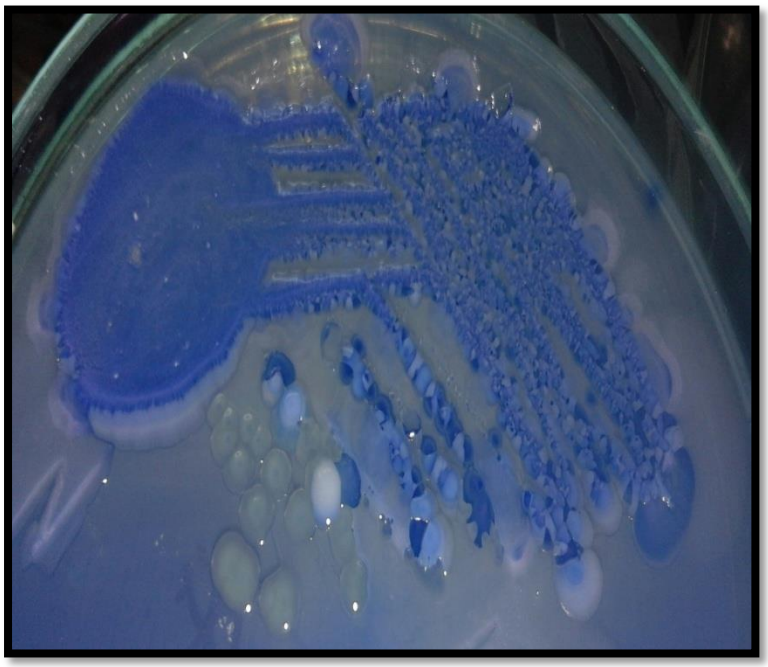


FIG 7:-ANEROBIC INCUBATION

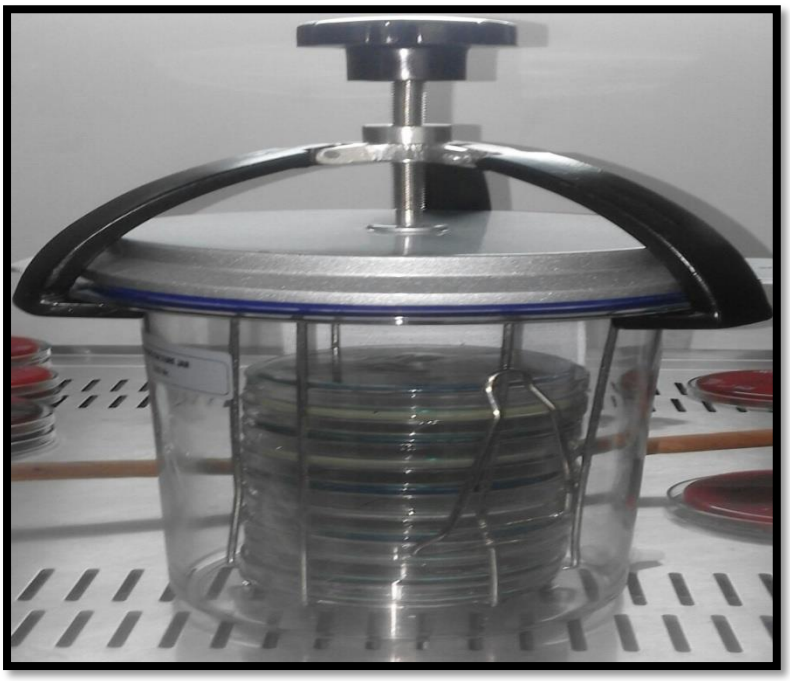
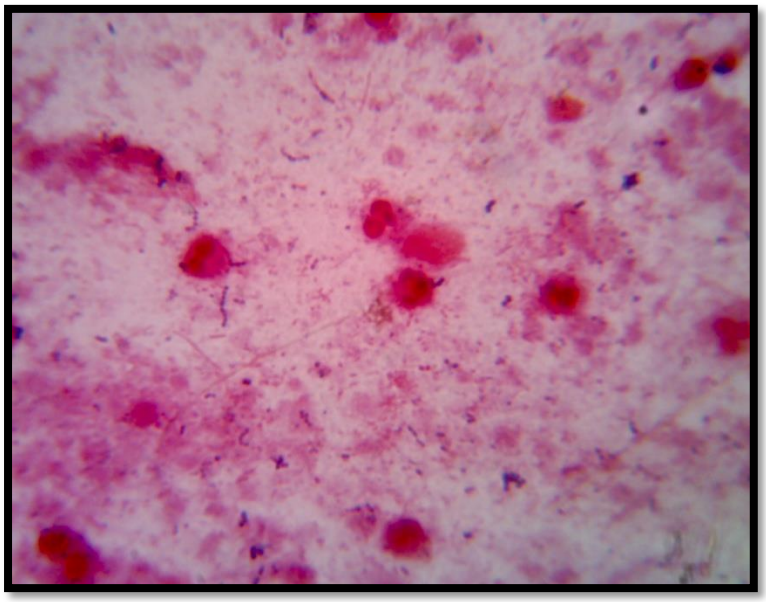


FIG 8 & 9:- GRAM STAINING SHOWING GRAM POSITIVE COCCI IN CHAINS



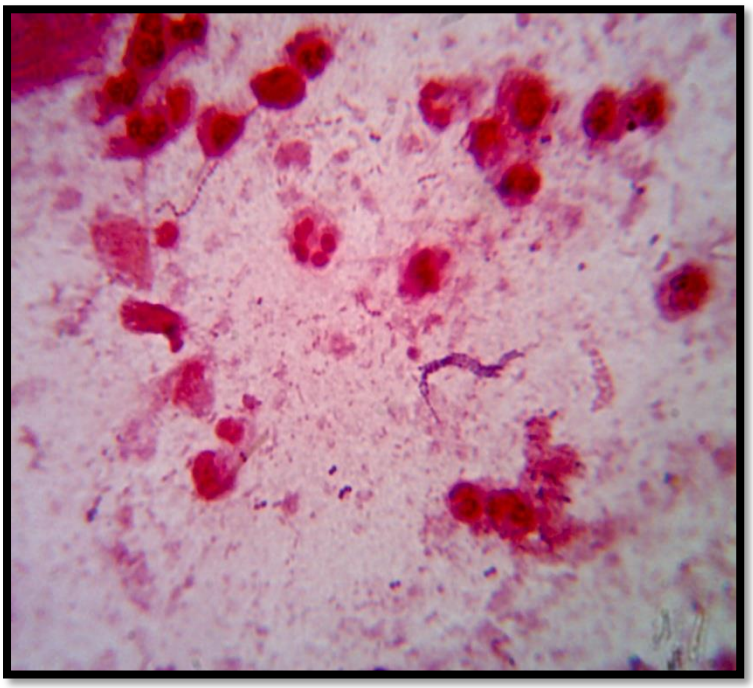
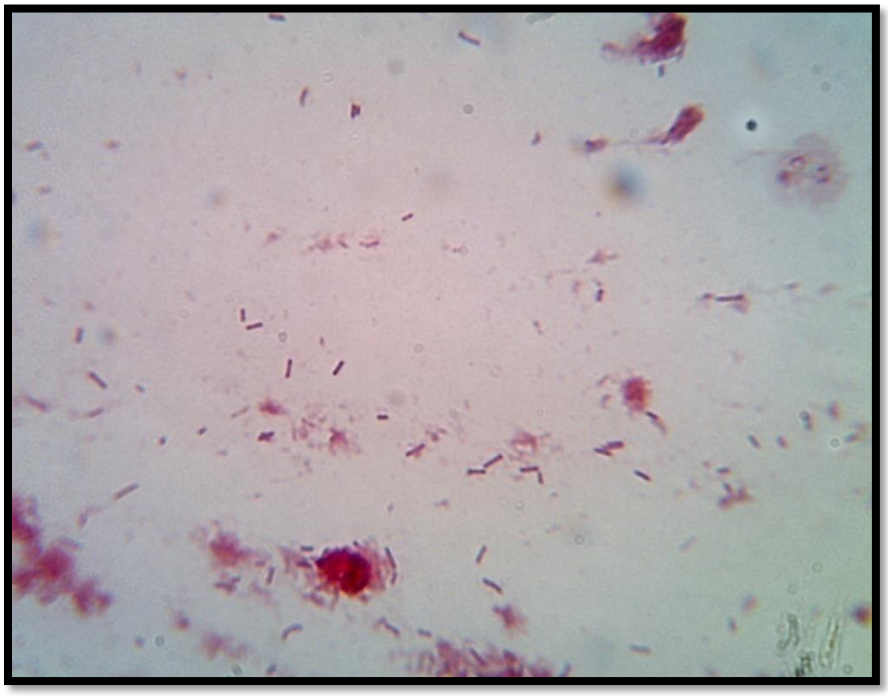
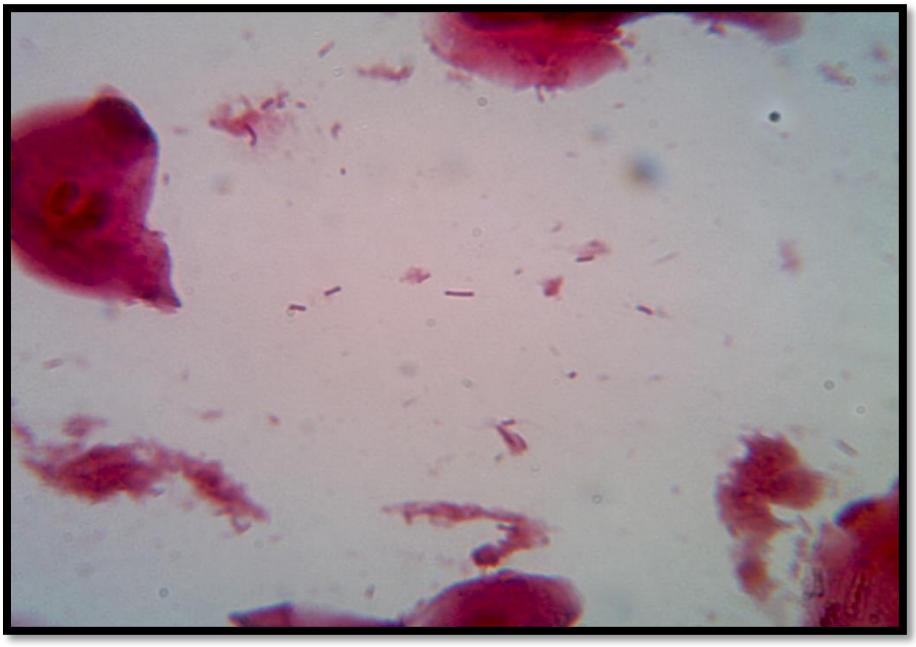


FIG 10 &11:-GRAM STAINING SHOWING LACTOBACILLI :-





RESULTS

The final results of the study were obtained using the student‘t’ test to compare and correlate the dmft/ DMFT values with the Streptococcus and Lactobacillus levels of school children and orphanage children.

The data was analyzed using descriptive and inferential statistics. Chi-square and ‘t’ test was used to compare the school students and orphanage children . There was a significant difference observed $p<0.05$ levels. All these analysis were carried out using SPSS 20.

When comparing the school and institutionalized students on SMCC and LBCC, (Table 1) there was a significant difference found in the SMCC and LBCC with a 't' value of 2.99 and 2.05 with p<0.001 and P<0.05 respectively.

Table 1:- Comparison between school and institutionalized students on SMCC and LBCC

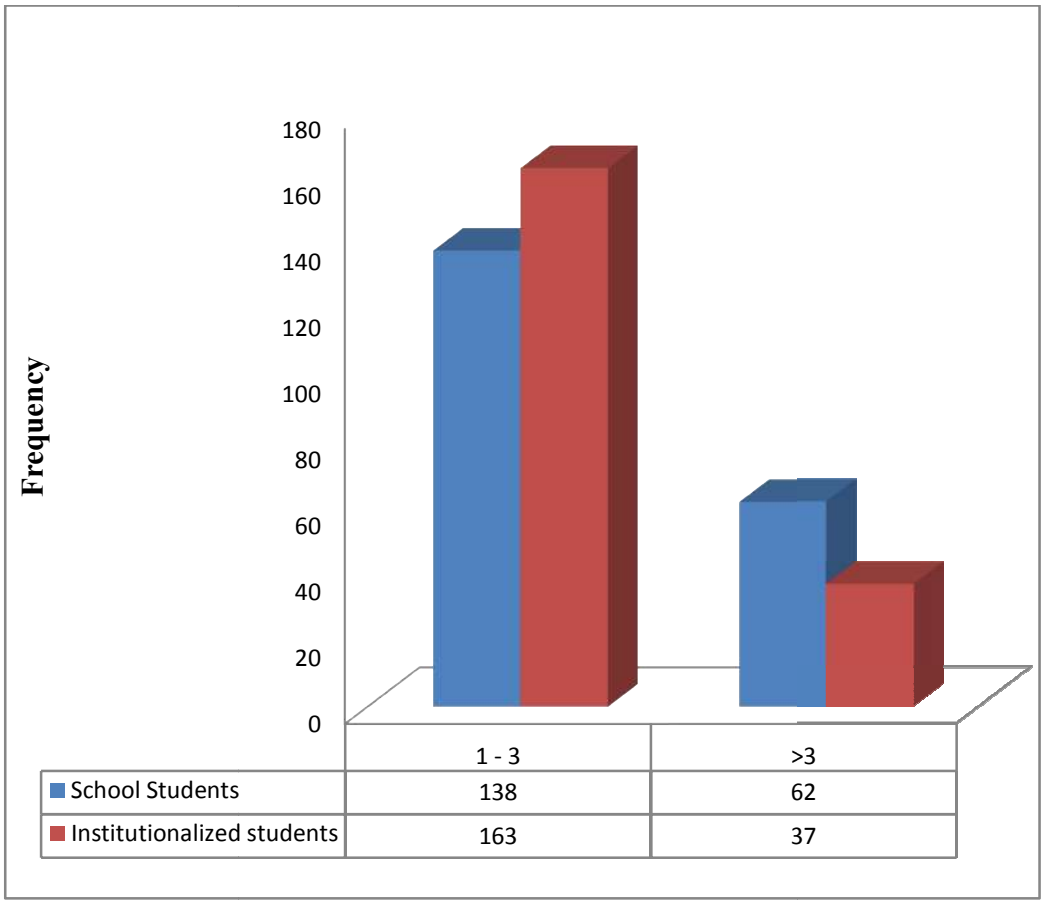
Parameter studied	Groups	N	Mean	SD	t value	p value
SMCC	School Students	200	**10^6** (596125.0)	1.83	2.99	0.00**
	Institutionalized students	200	**10^2** (197500.0)	3.68		
LBCC	School Students	200	**10^4** (38503.0)	47329.8	2.05	0.04*
	Institutionalized students	200	**10^3** (29129.50)	43862.8		

****Significant p<0.001 *p<0.05**

Table 2 Distribution of DMFT between school and Institutionalized students

Group	1 - 3	>3	Chi-square	P value
School Students	138	62	8.39	0.004*
Institutionalized students	163	37		

Graph 1 Distribution of DMFT between school and Institutionalized students

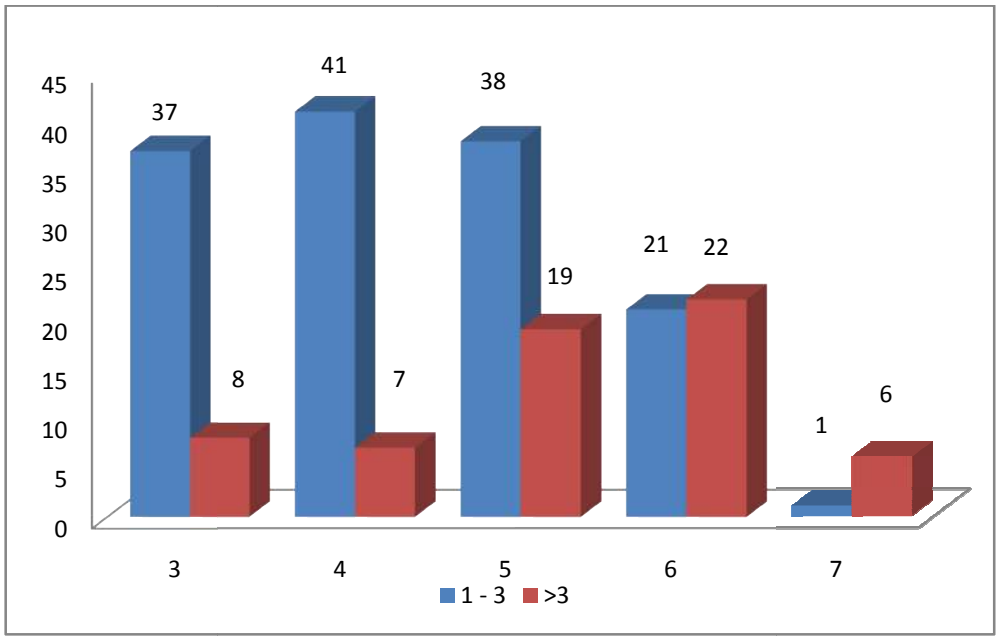


Comparison of the distribution of DMFT between school and Institutionalized students showed that there was significant difference in the distribution between both the students with school students having more number of frequency in >3, $p<0.05$.

Table 3. Comparison of SMCC and DMFT among school students

DMFT	10^3	10^4	10^5	10^6	10^7	Chi-square	P value
1 - 3	37	41	38	21	1	27.84	0.000**
>3	8	7	19	22	6		

Graph 2. Comparison of SMCC and DMFT among school students

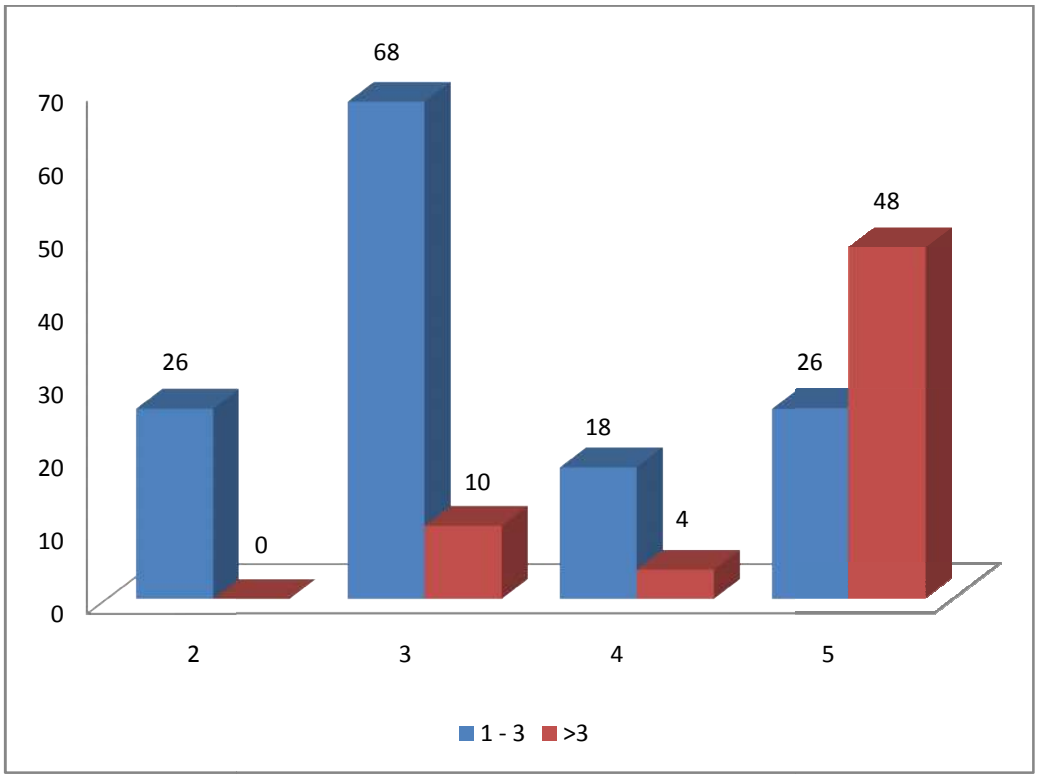


There was significant difference in the distribution of DMFT and SMCC among the school students p<0.001

Table 4. Comparison of LBCC and DMFT among school students

DMFT	10^2	10^3	10^4	10^5	Chi-square	P value
1 - 3	26	68	18	26	65.09	0.000**
>3	0	10	4	48		

Graph 3. Comparison of LBCC and DMFT among school students

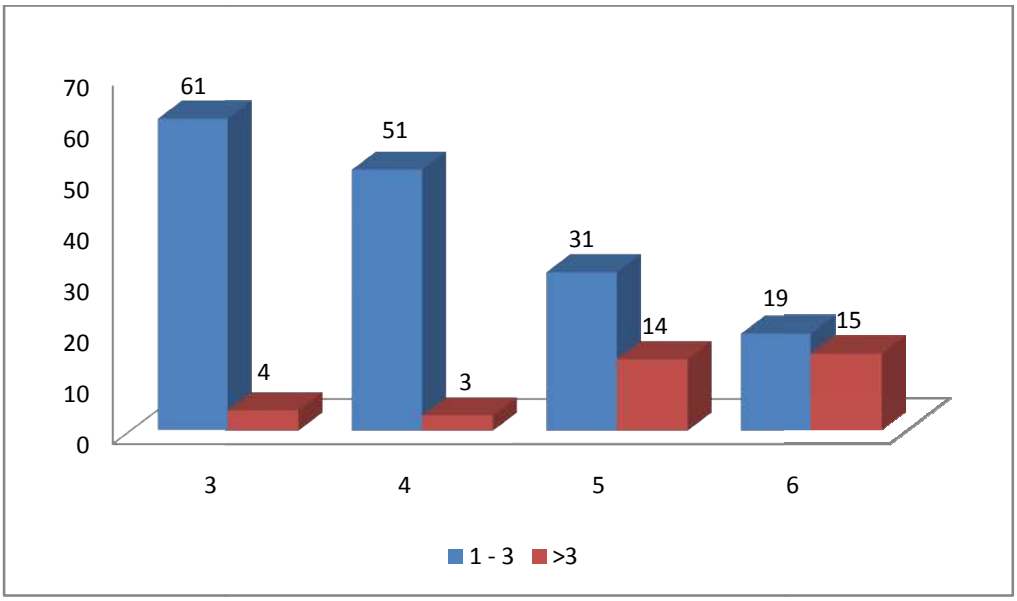


There was significant difference in the distribution of DMFT and LBCC among the school students p<0.001

Table 5. Comparison of SMCC and DMFT among Institutionalised students

DMFT	**10^3**	**10^4**	**10^5**	**10^6**	Chi-square	P value
1 - 3	61	51	31	19	32.53	0.000**
>3	4	3	14	15		

Graph 4. Comparison of SMCC and DMFT among Institutionalised students

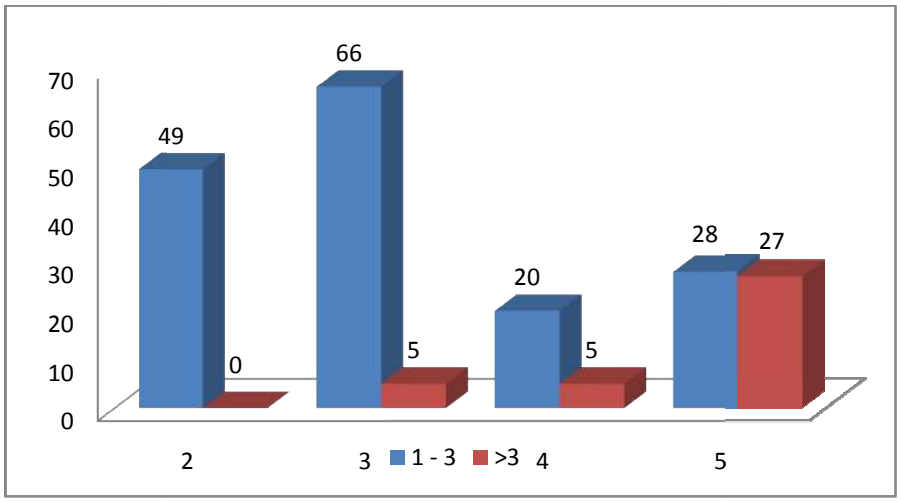


There was significant difference in the distribution of DMFT and SMCC among the Institutionalised students p<0.001

Table 6. Comparison of LBCC and DMFT among Institutionalized students

DMFT	10^2	10^3	10^4	10^5	Chi-square	P value
1 – 3	49	66	20	28	51.47	0.000**
>3	0	5	5	27		

Graph 5. Comparison of LBCC and DMFT among Institutionalised students



There was significant difference in the distribution of DMFT and LBCC among the Institutionalised students p<0.001

Table 7. Correlation between Colony count and DMFT among school students

School Students		LBCC	DMFT
SMCC	Pearson Correlation	.307**	.235**
	Sig. (2-tailed)	.000	.001
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis revealed that there was significant relationship found between SMCC and LBCC and DMFT $p<0.001$and $p<0.05$

Table 8. Correlation between Colony count and DMFT among Institutionalized students

Institutionalized students		LBCC	DMFT
SMCC	Pearson Correlation	.521**	.380**
	Sig. (2-tailed)	.000	.000
	N	198	198

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis revealed that there was significant relationship found between SMCC and LBCC and DMFT p<0.001and p<0.001

STATISTICAL INFERENCE:-

Initially study started with evaluation of oral cavity for DMFT scores of individuals in both the groups. On evaluating the results, 138 school children and 163 institutionalized children had DMFT scores between 1 and 3.Scores greater than 3 was found in 62 school children and 37 institutionalized with p value as 0.004.

While comparing the intergroup DMFT scores, the school children having a caries distribution score >3 was more in number which showed a statistical significance of $p<0.05$.

Being comparative study between school and institutionalized children at age group of 8-14, both values of Streptococcus Mutans and Lactobacilli were statistically significant, among the groups as significance being <0.001 in school and <0.05 in orphanage children .

When correlating the colony count with DMFT in school students, in streptococcus mutans colony count (SMCC) p value was <0.001 and in case of lactobacilli colony count (LBCC) it was <0.05 which means both are significant but SMCC being more significant.

Again while correlating the colony count with DMFT of orphanage children, the correlation significance shows both the SMCC and LBCC are equally significant as <0.001.

A study conducted by **Krishna kumar et al** on the streptococcus mutans and lactobacilli levels with dmft/DMFT scores revealed that both the bacterial levels was significantly higher, predominantly streptococcus mutans is higher between the groups. This is in accordance with the present study where a statistical difference of SMCC ($P<0.001$) and LBCC ($P<0.05$) in school children**.**[(2)]

The hard tissue lesion in orphanage children and normal school children was analyzed by **Arpita Mohan et al** and concluded that orphans had more carious lesions when compared to non orphan group [(39)]. A different caries level was found in the present study as orphan students had less caries than the non orphans. This difference in the caries level between the groups may be due to the geographical reason, dietary habits, fluoride exposure and other relevant factors.

The dental caries level experienced by orphans was lower than non-orphan controls, though the difference was insignificant. In the present study there is a significant difference between the two groups with higher caries level in case of school students [(37)]**.**This difference may be due to the intake of more sugary products availability for the non orphan groups.

The dmft scores obtained was significant lower in orphan children than in adolesence group in a study conducted by **Khare.V et al** between the age groups of 7-18 years of Udaipur district of Rajasthan .The present study is in accordance with the the above mentioned study showing p value 0.004 which means the orphanage children has a low caries level than the school children [(27)].

A higher dmft/DMFT scores were obtained among orphan children in a study conducted by **Dixit et al** which is in contrary to the present study. The higher incidence of Molluscum contagiosum in children residing in orphanages as compared to the normal population of the same age group was reflected in the higher incidence of DMFT/deft in orphanages as compared to the normal population **(59).**

A comparative evaluation of caries prevalence among orphan and non orphan children was carried out by **Sudipta Kar et al** and found a statistical difference between the orphan (34.15%) and normal children 17.44%**(44)** . This study is in contrary with the present study.. This differences in the prevalence's can be justified by several factors as less availability of food substances that gets adhere to the tooth surfaces and less sugar contained snacks availability which may lead to caries process involvement **(27)**

A DMFT comparison of orphans (5.27) and non orphans (2.03) showed a higher mean in case of orphans which is again dissimilar to the present study.This differences may be due to the age group under which the study was carried out .In the study conducted by Amjad et al the study group consisted of females between 12-18 years**(50)**. In institutionalized children, overcrowding, inadequate number of staff (caretakers), poor sanitation may contribute to poor oral hygiene, which may be one of the factors for an increased caries incidence in these children as compared to the general population. **(59)**

A study conducted by **P.P.Hedge et al** on the comparison of dental caries experience with the salivary levels of streptococcus mutans and Lactobacillus was 87.37% and 36.7% respectively.The present study also has the salivary levels of streptococcus mutans and Lactobacillus as <0.001 and <0.05 respectively which is in

accordance with the mentioned study.[20].This accordance may be due to the fact that the salivary sample collection method was similar in both the studies . In these studies the stimulated saliva was used.

The usage of stimulated saliva may cause an question about the reliability of the saliva collected in this method for a microbial analysis of streptococcus mutans an lactobacilli than the plaque samples in the present study .The justification for this may be derived from the previous established studies by **Sullivan et al[60] and Klock B et al [61]**because their study results prove that the number of streptococcus mutans and lactobacilli in dental plaque samples does not explain the variation in stimulated whole saliva .

A positively significance was found between the both MS and LB levels of saliva in the study conducted by **Priyadharshini et al** .The present study is in accordance with it [33].

There are also wide number of studies which reveals an close association of salivary levels of streptococcus mutans to carious tooth development [4,62,63,64,65,66]. This present study reveals a fact that not only streptococcus mutans responsible for caries process but lactobacilli also plays a major role .

A study conducted by **C.S. Toi et al** found that there was no relationship between mutans streptococci, lactobacilli counts and dmft in children with caries .Whereas the present study has a contrary results as there is relationship between the salivary bacterial levels of streptococcus mutans and lactobacilli levels and the DMFT scores of children.This result differences may be due to the errors in counting mutans streptococci

often arise during morphotyping of bacterial colonies on different types of selective medium. As morphotyping is subjective to the experience of the examiner and is therefore not always accurate. It is also to be mentioned that the selective medium used in that study was TYCSB agar (Trypticase, yeast, cystine, bacitracin agar). [18]

A study conducted by **Esian .D. et al** on the salivary level of streptococcus mutans and lactobacilli related to a high a risk of caries disease .The association of caries activity with the streptococcus mutans was significant where as with lacto bacilli no statistical significance was found. But in this study both streptococcus mutans and lactobacilli levels are significant.[46]

The semi-quantitative determination of the salivary level of lactobacilli and Streptococcus mutans represented as a main progress in the current scenario of dental practice. **O.G. GOLD et al**. [13] have used the agar blue mitis-salivarius medium with bacitracin for the first time in 1973 and it is being uesd still because of the selective development of Streptococcus mutans strains, while other microorganisms are inhibited . Similarly, there is also a seperate medium for the Lactobacillus which was been used for the first time by **M. ROGOSA et al** in 1951.[10] and it is being used still today because of the identification and facile cultivation of Lactobacillus strains.The above mentioned MSB (Mitis salivarius bacitracin agar) and Rogosa SL agar was used in the present study.

A study conducted by **B.Sakeenabi** and **S.S.Hiremath** on the caries experience with the salivary levels of streptococcus mutans, lactobacilli, salivary flow rate and buffering capacity among the school children of 6 year old and obtained the mean

streptococcus mutans count as 10^4 - 10^5 and lactobacilli count as 10^5.In the present study it is 10^2-10^6 and 10^3-10^4 which are in accordance. **(25)**

There was a high Streptococcus mutans and lactobacillus levels in the saliva which themselves did not influence the DMFS index in a study conducted by **Serpil et al.(67)** In the present study the streptococcus and lactobacilli level are influenced by caries level. This difference may be due to difference in the microbiological analysis method .This present study is in accordance with many other studies which accepts the correlation of microbial levels to that of carious processes.**(68,69,70,71,72,73)**

Orphans being less identified and authorized community their general and oral care needs has been not considered pronounced by the society. Coming to the normal school going children the availability of surplus food, snacks, chocolates and over protective nature of parents makes the child more dependent and also the more availability of carious causing food makes their oral cavity as a harbor for microorganisms.

Both the clinical and microbial analysis of this study helps to estimate the untreated caries level ,less awareness and insufficient exposure and knowledge regarding the oral health in child population. To intervene the needed population and give them knowledge regarding the oral health and preventive measures is major role of preventive dentistry .

Henceforth this study enumerates the following as results:-

- The orphan children being less advantaged and because of less availability of cariogenic food agents their carious level is comparatively low.
- When coming to normal school going children their availability and exposure to carious environment makes them prone to caries and microorganism in oral cavity.
- The microbial levels of streptococcus mutans and lactobacilli to the carious process is also proved to be interrelated.
- Inspite of whatever environment the child grows their knowledge towards carious prevention is low.

To built a better orally hygiene and healthy individual the following measures should be carried out:-

- Must aggrandize about the dental health awareness and prevention of dental caries.
- Increase the knowledge and availability of treatments by mass general and dental health camps .

The above mentioned measures can be carried out by the dental colleges, private trusties, general and oral health care professionals of the respective locality to built up an healthy society. However it doesn't stops here.These types of studies may also help the government to get a detailed lists of population who requires preventive treatments and also direct the health care professional of that particular locality to render a helping hand both morally and financially.

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INFORMED CONSENT FORM

Name: Mr/Ms _____ Age: Sex:

ADDRESS _____

_____

I hereby give my consent voluntarily to participate as a participant in this study. I agree to the following:

1. I have been informed to my satisfaction about the purpose of the study and the study procedures.

2. I understand that the study involves questions which may sometimes be personal.

3. I agree to co-operate fully for complete examination.

4. I am told that the investigating doctor and the institution will keep my identity confidential.

5. I understand that I have rights to withdraw myself from the study and also that

the investigator has the right to exclude me from the research at any point of time.

6. I am also aware that the investigator will collect salivary samples from me for this study.

Name Signature/ Thumb impression of Participant or parent/guardian Date:

CASE SHEET

NAME: - **CASE NO:-**

AGE & SEX: - **CLASS:-**

SCHOOL:-

ADDRESS:-

ECONOMIC STATUS OF PARENTS:-

OCCUPATION AND INCOME:-

PATIENT CONCERN: - YES / NO

CHIEF COMPLAINT:-

PAST DENTAL HISTORY:-

IF YES: - DECAY / FILLING/ MISSING / PAIN /ANY OTHER REASON

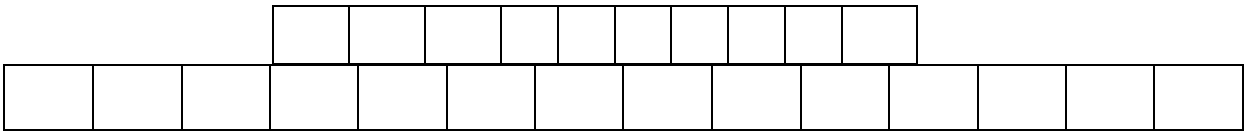
Brushing Habit: - Once /Twice daily.

Snacking Habit:-Occasionally / moderately /frequently

DMFT SCORE (DECAYED MISSING FILLED TEETH):-

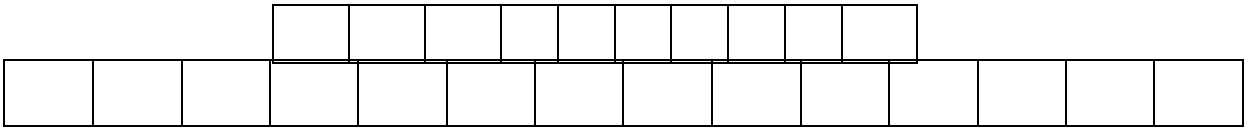
PRIMARY DENTITION:-

55 54 53 52 51 61 62 63 64 65



17 16 15 14 13 12 11 21 22 23 24 25 26 27

85 84 83 82 81 71 72 73 74 75



47 46 45 44 43 42 41 31 32 33 34 35 36 37

INTERPRETATION:-

PROVISIONAL DIAGNOSIS:-

FINAL DIAGNOSIS:-

COLONY COUNT OF STREPTOCOCCUS MUTANS AND LACTOBACILLI

S.No	Streptococcus Mutans Colony Count	Lactobacillus Colony Count
1	10^6	10^5
2	10^4	10^5
3	10^5	10^4
4	10^5	10^3
5	10^6	10^5
6	10^5	10^5
7	10^6	10^5
8	10^4	10^3
9	10^7	10^5
10	10^6	10^5
11	10^5	10^5
12	10^7	10^4
13	10^3	10^3
14	10^4	10^3
15	10^7	10^5
16	10^5	10^4
17	10^3	10^3
18	10^5	10^5
19	10^5	10^5
20	10^6	10^5
21	10^5	10^5
22	10^7	10^5
23	10^6	10^5
24	10^6	10^5
25	10^5	10^5
26	10^5	10^5
27	10^3	10^5
28	10^4	10^3
29	10^3	10^2
30	10^6	10^3
31	10^5	10^3
32	10^4	10^3
33	10^3	10^3

34	10^4	10^3
35	10^3	10^5
36	10^5	10^3
37	10^3	10^3
38	10^4	10^3
39	10^3	10^4
40	10^6	10^5
41	10^5	10^3
42	10^4	10^3
43	10^3	10^3
44	10^4	10^3
45	10^3	10^2
46	10^5	10^3
47	10^3	10^3
48	10^4	10^3
49	10^3	10^3
50	10^6	10^3
51	10^5	10^3
52	10^4	10^3
53	10^3	10^3
54	10^4	10^3
55	10^3	10^4
56	10^5	10^5
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82	10^4	10^2
83	10^5	10^3
84	10^4	10^2
85	10^3	10^2
86	10^5	10^5
87	10^5	10^4
88	10^4	10^3
89	10^3	10^4
90	10^6	10^3
91	10^6	10^5
92	10^4	10^4
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94	10^4	10^3
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104	10^4	10^3
105	10^5	10^2
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108	10^4	10^3
109	10^3	10^2

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399	10^6	10^4
400	10^6	10^5

INSTITUTIONAL ETHICS COMMITTEE
VIVEKANANDHA DENTAL COLLEGE FOR WOMEN

SPONSORED BY : ANGAMMAL EDUCATIONAL TRUST

Ethics Committee Registration No. ECR/784/Inv/TN/2015 issued under Rule 122 DD of the Drugs & Cometics Rule 1945.

J. Baby John	**Chair Person**	**Dr. (Capt.) S. Gokulanathan**	**Member Secretary**
K. Jayaraman	Social Scientist	Mr. A. Thirumoorthy	Legal Consultant
R. Jagan Mohan	Clinician	Dr. N. Meenakshiammal	Medical Scientist
S.T. Suresh	Scientific Member	Dr. R. Natarajan	Scientific Member
Sachu Philip	Scientific Member	Mr. Kamaraj	Lay Person

No: VDCW/IEC/12/2015 Date: 14.12.2015

TO WHOMSOEVER IT MAY CONCERN

Principal Investigator: Dr. Gaytry.S.S

Title: Comparison of caries experience with salivary levels of Streptococcus mutans and Lactobacilli in 8-14 years old children between institutionalized (orphanage) children and school going children in Namakkal District, Tamil Nadu.

Institutional ethics committee thank you for your submission for approval of above proposal. It has been taken for discussion in the meeting held on 08 .12.15.The committee approves the project and it has no objection on the study being carried out in Vivekanandha Dental College For Women.

You are requested to submit the final report on completion of project. Any case of adverse reaction should be informed to the institutional ethics committee and action will be taken thereafter.

CHAIRMAN
INSTITUTIONAL ETHICS COMMITTEE
VIVEKANANDHA
DENTAL COLLEGE FOR WOMEN
Elayampalayam-637 205
Tiruchengode (Tk) Namakkal (Dt),
Tamilnadu.

SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
VIVEKANANDHA
DENTAL COLLEGE FOR WOMEN
Elayampalayam-637 205.
Tiruchengode (Tk) Namakkal (Dt),
Tamilnadu.

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